

Managing Outside the Box to Achieve High Forage Diets

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High forage starts with the soils driving the rotation, which drives what the cows are fed. We don't count forage quality until it reaches the mouth of the cow. We want high forage because cost of energy is 31% cheaper from forage (corn silage) vs. concentrate (corn grain \$4.38/bu). Cost of protein is 21% cheaper from forage (alfalfa silage) than from concentrate (soybean meal \$439/ton). Dr. Larry Chase of Cornell in a 2012 study of herds at 70 and 80% forage diets producing over 80 pounds of milk found fewer metabolic disorders; less acidosis, fewer foot problems, lower vet costs, and about a 30% increase in income over feed cost (IOFC).

A key factor to achieving this is to have enough forage and that digestibility is > 60% NDFd. Successful livestock production is growing energy, protein, and digestible fiber, in sufficient amounts and low cost. The cardinal rule is "soils drive the rotation, which drives what the cows are fed." What that crop is will change from field to field, farm to farm, location to location. This does NOT *require* corn silage and alfalfa, although it may be the best choice for some fields on your farm. Regular corn silage, BMR corn silage, BMR sorghum species silage, red clover, winter forages, and intensively managed grass all can support profitable high forage diets. Unfortunately, too many acres on too many farms are sequential monoculture. Shorter rotations break insect, disease, and weed cycles. Numerous studies have documented yield increases in rotated vs. non rotated crops. Unfortunately rotations are not pushed vigorously as the only one who profits is the farmer.

A new rotation for much of the northeast is the use of winter forages in a double crop system. The feed produced is some of the most highly digestible forage we have grown. The environmental benefits of a cover crop are changed from an expense to a highly profitable forage crop. An added bonus is that yields of corn and soybeans following winter forages have been documented to increase. We have developed multiple rotation variations on this theme. Winter forage followed by a summer energy crop has been found to directly increase yield/acre 25 to 35%.

Winter forage with a clover legume in a short two-year rotation followed by a summer energy crop and back to winter forage with clover has boosted yield, and with proper conservation tillage, significantly reduced soil erosion on many of our upland, less than ideally drained soils. Winter forage harvested at early soft dough with a companion legume is nearly a complete ration for growing replacements and has incredibly high yields.

The use of winter forage puts a time and season constraint on the summer crop grown. Most often that is corn for silage. Farmers' perception that longer season corns are a requirement for high yields makes them reluctant to reduce the length of season of corn in order to optimize the yield of the winter forage. Both research and farmer experience has found that the slight, if any, yield decrease in the corn is more than offset by winter forage yield of higher milk producing ability/ton than that of the corn it replaces.

The problem in more northern areas where the corn silage season is shortened by winter forage is the significant reduction in the number of varieties of highly digestible corn silage available for planting. For much of the area, targeting shorter season varieties completely eliminates the use of the longer season, BMR corns with high NDF digestibility that have been so successful in very high forage diets.

New genetics in a potentially new crop are rising to fill that niche. The new (at least to most northern US farmers) crop is BMR sorghum. New varieties with the brachytic dwarf gene have solved the major problem of poor stand ability that plagued older BMR sorghum varieties. The shorter season BMR sorghum with a potentially wider harvest window than corn has the ability to deliver high yields of highly digestible forage while fitting in the narrower summer growing season. More, even shorter season, BMR sorghums are being tested now. The use of drilled crops to maximize sunlight interception has moved the crop yields of sorghum to equal those of many corn silage fields. It needs to be planted into warm soils which are present after we take our winter forage off in May.



Farmers harvest winter forage, harvest the rest of their prime first cutting, spread manure on the winter forage stubble, and then drill the sorghum into a warm soil for rapid emergence.

A third new crop is the use of very high yielding short season legumes such as red clover. The statement, “that wet slop my grandfather used to grow that never dries,” is not today’s crop. We have clearly shown that with modified wide swath techniques we can dry clover to 35% dry matter the same day it is mowed. Red clover has feed value equal to or exceeding alfalfa cut at the same time. It can be harvested a little later and still have the feed quality of alfalfa harvested earlier. Thus, you are opening another window for hay crop harvest. This reduces risk in our more variable weather, as you now have two chances (alfalfa peak and clover peak) to get the quality forage necessary to feed cows a high forage (>60%) diet that supports greater production and components throughout the entire lactation. More importantly, from a nutritional standpoint, red clover has enzymes

that inhibit protein breakdown for more bypass protein. Bypass protein is incredibly expensive even though it is added in small amounts, so using red clover can produce milk at a lower cost. Researchers at the ARS found clover also contains a compound that inhibits hyper-ammonia rumen bacteria from destroying protein, thus increasing the metabolizable energy for milk production (breeders are trying to move it to alfalfa—you can have it today in clover). Maximizing the use of clover protein and energy reduces off-farm purchased protein. This reduces the importation of phosphorus onto the farm and aids in more nutrient balanced farms.

None of these crops is a silver bullet in itself. Management is still needed to get that quality to the mouth of the cow. They are tools for farmers to use to best match the crop to their soil type. A more diversified rotation reduces the risk of catastrophic crop loss in our increasingly variable weather. All of these options have the potential to produce high yields of highly digestible forage critical to support high forage diets.

